

1st Workshop on

# Coherent Synchrotron Radiation in Storage Rings



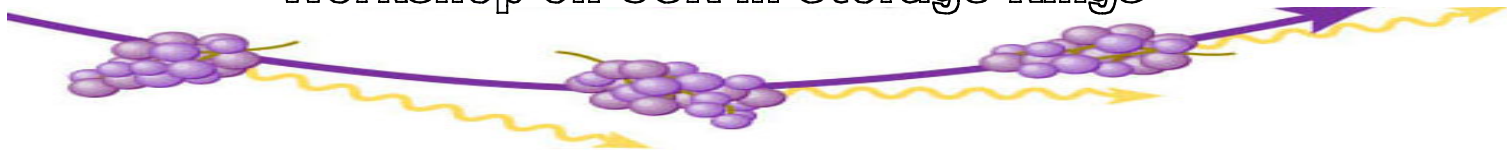
Napa, California  
October 27-29, 2002

# Are storage rings dead (or merely engineering challenges?)

- LINACs have been christened the next generation light sources. Do storage rings have anything to offer other than incremental improvements and increased capacity?
- Can rings provide fully coherent photon beams at any wavelength?

---

Workshop on CSR in Storage Rings

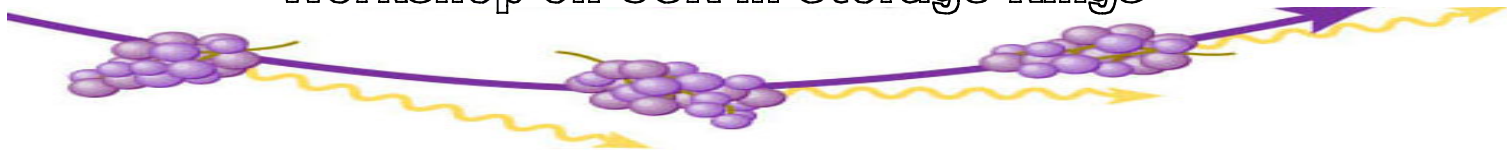


# Advantages of storage rings

- Inherent source stability (i.e. same electrons each pulse)
- Inherent high average flux (rep rate in hundreds of MHz)
- Decades of experience and understanding

---

Workshop on CSR in Storage Rings

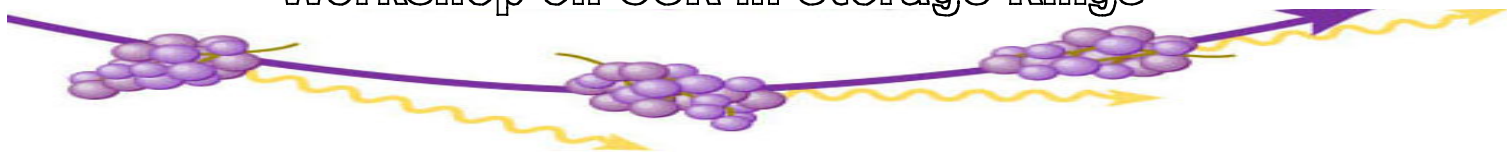


# A few hopeful signs...

- A theory predicting thresholds of a beam instability driven by synchrotron radiation given by Heifets and Stupakov. Some experimental results explained by this.
- The first observation of stable coherent SR made at Bessy-II. How did they do this?
- Can we make a new source using this? Does anybody want such a source?

---

Workshop on CSR in Storage Rings

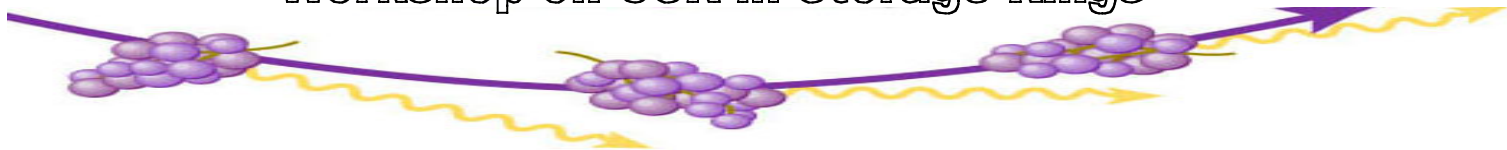


# Workshop Topics

- Analyze and discuss first experimental results of stable CSR observed at Bessy-II.
- What is the effect of the CSR on the beam?
- How would we build a dedicated source of CSR?

---

Workshop on CSR in Storage Rings

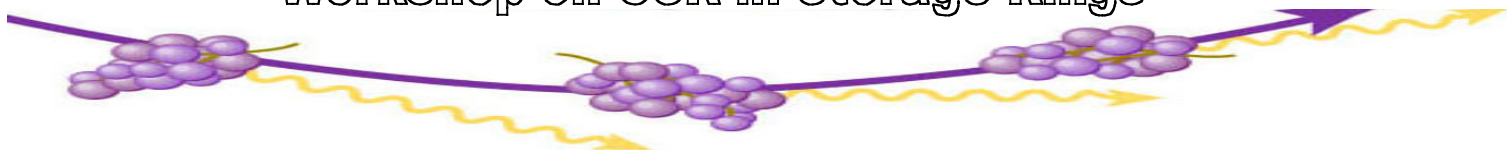


# Bessy-II Results

- Is there an alternative (other than CSR) explanation for the observations?
- Can we postdict their results?
- How can bunch lengths <few picoseconds be measured accurately?
- Can the CSR be observed directly in the time domain?
- Can we predict similar results for any other rings?

---

Workshop on CSR in Storage Rings

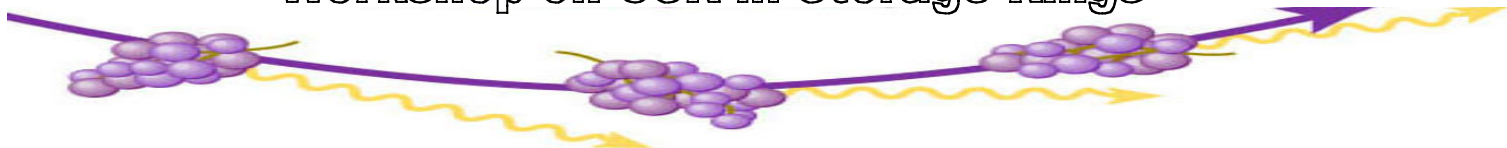


# CSR Instabilities

- Is the radiation impedance dominant at the frequencies of interest?
- Can the instability threshold be increased via increased synchrotron tune spread (i.e. Landau damping)?
- Can the instability itself be used as a source
- Does the instability hurt the beam (i.e. increased energy spread, bunch length, etc.)?

---

Workshop on CSR in Storage Rings



# Dedicated CSR source

- Do the scientific prospects justify a dedicated source?
- What does a ring-based source look like? What energy? Low momentum compaction?
- Are there any new ideas? What are the limits?

---

Workshop on CSR in Storage Rings

